RAGBRAI Geopedia

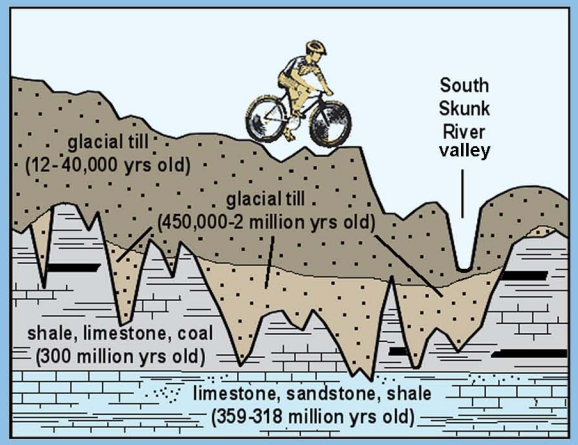
Glacial Eratics

Have you noticed a variety of rounded boulders or piles of unusual rocks along the farm fields? These rocks are "erratics." Geologists define erratics as stones or boulders that have been carried from their place of origin by a glacier and then left stranded by melting ice in areas where the bedrock is of a different composition. In Iowa, glacial erratics are commonly observed where glacial deposits occur at the land surface, primarily in the north-central and northeastern parts of the state. In western and southern Iowa, erratics generally lie buried beneath wind-deposited silts (loess) that cover the glacial materials.

When these areas of the state were settled, farmers were forced to clear fields of the rock obstacles in order to plow and cultivate. Many of the erratics were used to build fences and foundations, while others were just piled along fence rows or into unused field corners where they are seen today. Clearing farm fields of glacial erratics is a necessary and frequent chore wherever glacial deposits are cultivated. Over time, seasonal freezes and thaws work these rocks upward from below the plow zone to the land surface. Smaller glacial erratics can be hauled out of the fields, larger ones are frequently blasted apart by dynamite and the pieces hauled away, but some of the largest are just left in place and avoided. Glacial erratics in Iowa are not difficult to identify. The vast majority are igneous or metamorphic rocks, rather than the usual sedimentary rocks of sandstone, limestone, dolomite, and shale that constitute the bedrock under most of Iowa. If you pick up a granite rock, composed of interlocking crystals of pink feldspar and glassy quartz, you can be sure it is not native and that it came from outside the state, most likely carried by glacial ice.

COVER PHOTO: *The High Trestle Trail bridge over the Des Moines River west of Madrid in Boone Co.*

Day 4 Milestones



Start: **Boone**

South Skunk River valley: **miles 59-60**

Finish: **Altoona, mile 70**

For More Information...

A guidebook on the Saylorville Spillway can be found at:
www.iowageology.org/pdf/GB84.pdf

Information about glacial boulders in Iowa can be found at:
www.igsb.uiowa.edu/browse/boulders/boulders.htm

More information about glacial eratics can be found at:
www.igsb.uiowa.edu/Browse/landscap/landscap.htm

More about the Dragoon Trail can be seen at:
www.iowadot.gov/autotrails/bridges.aspx?Dragoon%20Trail

Information on the High Trestle Trail is available at:
www.inhf.org/trails/high_trestle_trail/hightrestletrail.htm

A great video about the High Trestle Trail can be seen at:
www.iptv.org/iowaoutdoors/story.cfm/story/3111/iao_20110609_104_high_trestle_trail_bridge/video

Information about public health concerns specific to Iowa, including arsenic, nitrates, and commonly used pesticides can be found at:
www.iowapha.org/

RAGBRAI 2011

Learn about the Land

Wednesday, July 27

Day 4

Iowa DNR -Geological and Water Survey
109 Trowbridge Hall
Iowa City, IA 52242
www.igsb.uiowa.edu

US Geological Survey - IA Water Science Center
400 S. Clinton St.
Iowa City, IA 52240
http://ia.water.usgs.gov

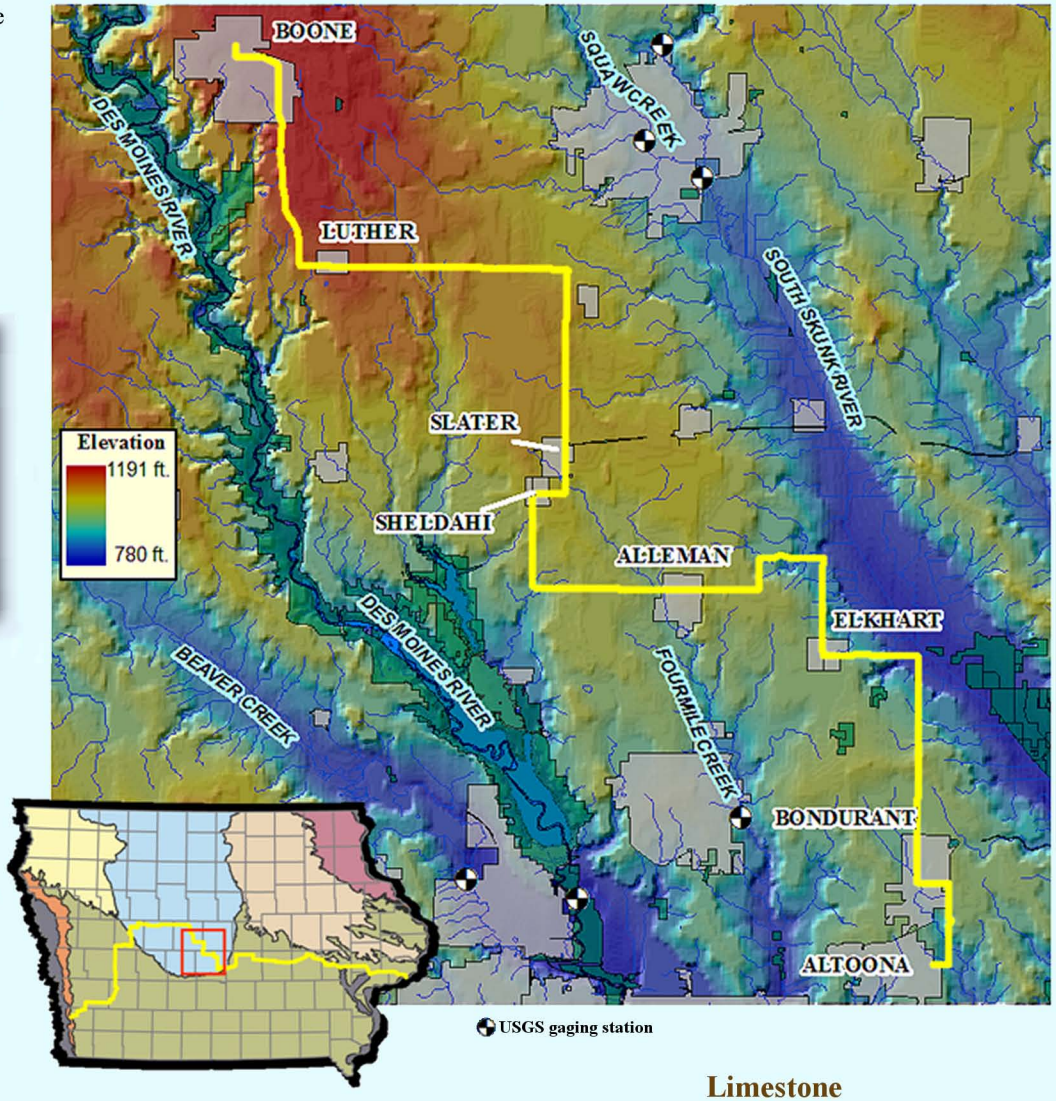
Iowa Limestone Producers Association
5907 Meredith Dr.
Des Moines, IA 50322
www.limestone.org

Saylorville Dam and Emergency Spillway

Construction of the 6.750 foot **Saylorville Dam** across the Des Moines River by the U.S. Army Corp of Engineers was completed in 1971, impounding the 54 mile long, 16,700 acre Saylorville Lake. Not only was this reservoir designed as a flood control measure for the Des Moines River but also for the Mississippi. In addition to providing flood control, this 26,000 acre project maintains a minimum downstream river flow for water supply and water quality during drought periods. Outdoor recreation including camping, boating, fishing, hiking, biking, and wildlife watching are enjoyed in and around the lake.

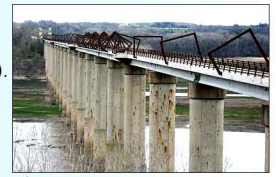
Pennsylvanian rocks exposed in Saylorville Gorge

A series of floods in 1984, 1991, 1993, and 2010 filled Sayorville Lake and forced water over the Saylorville Dam's emergency spillway. These torrents of water cut deeply into the spillway, exposing about 60 feet of Pennsylvanian sandstones, shales, limestones. and coals of the Cherokee Group, deposited in and near the shallow seas that covered Iowa about 310 million years ago. Access to the Saylorville Gorge is restricted due to the dangerous high-walls, but exposed strata can be viewed from several overlooks.



The High Trestle Bridge Trail

The High Trestle Trail is a 25-mile trail constructed on an abandoned railroad bed that connects the communities of Ankeny, Sheldahl, Slater, Madrid, and Woodward. The centerpiece of the trail is a 13-story high, half-mile long bridge that crosses the Des Moines River Valley. Built on railroad bridge piers, the bridge features bridge art based on an artist's (David Dalhquist) view through one of the many area mine shafts (see cover photo). The bridge also includes six scenic overlooks where riders can pause and enjoy the view.



Draining the Des Moines Lobe

The Des Moines Lobe, in its natural state, is a poorly drained landscape characterized by wetland systems. This type of setting, however, is not convenient for raising crops such as corn and soybeans. From the mid to late 1800s, farmers began constructing ditches and tile lines to directly channel the water from the saturated soils to the nearest stream or river. There are more than six million acres of cropland (slightly more than half of the land in agricultural production) in Iowa where soil wetness limits productivity. Based on the large number of acres susceptible to excessive wetness, and the yield response from removing this wetness, the agricultural community has an economic interest in tile drain systems.

With the added benefit of fast water removal from the area, however, comes the unfortunate transfer of nitrogen and other agricultural chemicals to area lakes and rivers lost from farm fields. This costs the farmers and the discharge from tile lines provides a direct conduit from fields to river systems for these agricultural chemicals, where they eventually wind up in the Gulf of Mexico. Nitrate contamination from Midwestern streams is a major cause of the Hypoxia Zone ("dead zone") in the Gulf of Mexico.

The Dragoon Trail

The Dragoon Trail, opened in 1933, is a 200-mile "greenbelt" that runs along the Des Moines, Boone, and Raccoon rivers past cultural, historical, and scenic-natural attractions. The trail follows the route of the 1st U.S. Dragoons, the country's first mounted infantry unit which was stationed at Fort Des Moines. Their mission in 1835 was to scout Iowa after it was acquired by the federal government in the Black Hawk Purchase of 1832. The Dragoon Trail runs from Des Moines through Boone and Stratford then branches north to Fort Dodge and Webster City. In 1935, to mark the 100th Anniversary of the Dragoon March, the Daughters of the American Revolution erected a series of bronze plaques at various locations along the old trail.

Limestone

Limestone is one of the most common rocks in Iowa. It is a sedimentary rock composed largely of the mineral calcite(calcium carbonate: $CaCO_3$). Limestone often contains variable amounts of silica in the form of chert or flint, as well as varying amounts of clay, silt, and sand as disseminations, nodules, or layers within the rock. The primary source of the calcite in limestone is most commonly marine organisms.

Iowa Limestone Producers Association